Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Unlicensed Operation in the Band 3650 – 3700 MHz	)	ET Docket No. 04-151
	)	
	)	
Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band	)	ET Docket No. 02-380
	)	
	)	
Amendment of the Commission's Rules With Regard to the 3650-3700 MHz Government Transfer Band	)	ET Docket No. 98-237
	)	

COMMENT OF TROPOS NETWORKS

Tropos Networks, headquartered in Sunnyvale, California, submits this Comment in response to the Commission's Notice of Proposed Rulemaking to allow unlicensed devices to operate in the 3650-3700 MHz band ("3650 MHz band") band.

Tropos believes that the Commission's proposal, when integrated into the emerging comprehensive initiative promoting wireless broadband, will spur economic growth by making competitive advanced services available to more people. Designating this band for licensed use will not yield this enormous potential. Tropos technology can coexist with the satellite services presently licensed in the 3650 MHz band. The Commission's proposal to allow unlicensed devices to operate with higher power than currently authorized under Part 15 of its Rules is particularly significant.

Tropos Technology

Tropos technology delivers city-wide mobile broadband access via a scalable, reliable and secure Wi-Fi infrastructure. The heart of the Tropos solution is a new class

of product called a Wi-Fi cell, which layers patented routing intelligence on top of standard 802.11 to form an economical, self-configuring and self-healing wireless broadband data network that forwards client data through a mesh along the highest throughput path to a wired network. The result is a high performance, large scale Wi-Fi deployment with high throughput that does not require wired backhaul to each access point, installer truck rolls nor expensive and complex client devices and software. A Tropos system can be deployed at a multi-square-mile scale in a matter of days, providing an outdoor mobile broadband experience indistinguishable from indoor wireless and wired experiences.

Tropos patented technology maximizes throughput from client to server, eliminates the need for per node wiring and dynamically self-organizes as nodes are added or subtracted, backhaul supplied or removed, and interference comes and goes. The result is unprecedented bandwidth on the street, easy and low cost installation and operation, and true metro-scale coverage. Tropos products are providing a range of service providers and public safety agencies with the benefits of metro-scale Wi-Fi networks. Wireless broadband networks using Tropos technology are now operational in a myriad of environments ranging up to 16 square miles. Specific cities include Corpus Christi, Texas, Chaska, Minnesota, North Miami Beach, Florida, New Orleans, Louisiana, San Mateo, California and Cerritos, California.

The dense cell architecture underpinning these networks enables true broadband. Internet access as well as mission-critical broadband applications in mobile public safety environments, such as mobile database access, video surveillance, and GIS inquiries is a

reality. Without any special client technology, Tropos products have been successfully deployed in cellular mesh networks to deliver up to 11 Mbps data rates with 99% coverage over multiple square miles.

Tropos' mesh network is premised on principles similar to those on which the Internet is based. The technology enables a self organizing system allowing nodes to be added or subtracted, a feature that remedies faults in backhaul or interference that are encountered. Any laptop or other device with Wi-Fi capability can connect to the network of antennas and stay connected even while the user carries or drives the laptop from place to place. The networks consist of Wi-Fi cells mounted on street lamps and telephone poles.

Tropos presents a state of the art security capability premised on decoupling security from the spectrum in which it products run. It leverages the inherent intelligence of its Wi-Fi cells and integrates the most vigorous Internet security techniques to offer a robust and multi layered security framework that can be efficiently and effectively upgraded. It confronts and deters the committed hacker who pursues disruption and invasion of either unlicensed or licensed networks.

Tropos products, encompassing dense cells and mesh, benefit any radio technology by bringing about enormous efficiencies in transmission and delivery. The result is a critical contribution to innovation and competition in the broadband environment and emanates from reducing dramatically backhaul costs and use of open standard radio. It presents a 20x better price performance than other mobile wireless

broadband technologies. The result is a tangible and viable competitive choice in real broadband

The Commission's broadband initiative recognizes that wireless broadband is at the forefront of enormous engineering innovation and advances. This capability presents to the Commission much broader parameters to examine and establish rules ensuring that varying users and services coexist. Tropos architecture reflects a demonstrated capability to overcome a range of challenges presented by propagation and interference in real time and can provide meaningful service in the 3650 MHz band without encroaching upon existing services.

Expanding Competitive Broadband Availability Depends Upon Access to Spectrum

The Commission's proposal distinguishes the unique and innovative direction wireless broadband technology brings to the goal of expanding broadband availability. A comprehensive endeavor increasing wireless broadband access must be pursued to make a meaningful difference so competitive broadband access is available to all Americans. Meeting the growing demand for higher-powered unlicensed devices operating at lower frequencies, where the combination of propagation characteristics and higher power are more conducive to longer-range communications, is critical to this goal.

Current unlicensed spectrum allocations are at high frequencies and deter this expansion. Waves at lower frequencies are longer in length. Longer length waves hold their energy over long distances and also bounce around physical objects such as buildings. These longer waves are the ideal for wireless broadband, just as they were the

ideal for the original allocation for broadcast television. The waves also possess the capability to carry tremendous amounts of information. In these bands, wireless broadband can deliver very high bit rates at lower cost.

In its initiative to broaden wireless broadband availability, the Commission should continue to comprehend how the location and propagation character of particular spectrum has a profound impact on the investment costs of the services using the band and the ultimately the availability of these services. If costs are ignored, varying frequency bands can be used for the different services. But cost has a tangible negative impact. It delays and hinders the rollout of services and embeds additional costs on consumers for many years. With high speed broadband access a national priority, with its recognized ability to generate economic growth, a fundamental premise is that the lower the frequency assigned for wireless broadband the greater the ability for more millions of citizens to have not only broadband access but a competitive choice.

Authorizing unlicensed operations in the 3650 MHz band promotes this fundamental. The band will provide an additional spectrum resource, while promoting a synergy with other bands, particularly 2.4 GHz (2400–2483.5 MHz) and 5.8 GHz (5.15–5.825 GHz), being used for unlicensed operations. Efficiencies will accrue to benefit the wireless broadband rollout. The open standard format of wireless broadband has already demonstrated how the reality of a competitive environment fosters innovation and service. The Commission's commitment of the 3650 MHz band to unlicensed broadband will further this robust market. In contrast, licensing fixed operations in the band will undermine this potential.

Yet it is important to recognize that the 3650 MHz band is but part of what is necessary to bring competitive broadband access to all Americans. Current unlicensed spectrum allocations and those proposed by the Commission continue to be at very high frequencies, and as noted, are accompanied by high costs that deter needed expansion. If competitive broadband access is to be meaningful, it must include the spectrum scheduled to become available in the 700 MHz band as a consequence of the television broadcast digital transition.

The 700 MHz band is ideal for wireless spectrum as it has excellent propagation characteristics allowing the build out of inexpensive and ubiquitous wireless broadband networks. Moreover, the faster the television digital transition is expedited, the sooner a portion of the 700 MHz spectrum can be made available for competitive broadband access to all Americans. Allowing unlicensed spectrum devices to operate in the TV Broadcast spectrum at locations and at times when the spectrum is not being used is also critical. The proposal to dedicate the 3650 MHz band to unlicensed broadband will contribute to the Commission's overall initiative to broaden the availability of wireless broadband. To truly expand broadband access, this initiative must include commitment of spectrum below 1GHz to unlicensed broadband devices, particularly in the 700 MHz band.

The Commission's Proposed Protection Criteria Are Reasonable

Tropos believes that the Commission's two approaches for enabling fixed and non-fixed unlicensed devices to operate will afford Fixed Satellite Service (FSS) earth stations and Federal Government operations in the 3650 MHz band protection. The first

approach applying to fixed unlicensed devices requires professional installation of each device and will ensure that that operation at a particular location and power will not result in interference to any FSS earth station. We do, however, offer one cautionary note in this regard. The requirements for professional installation must not be so onerous that few technicians can qualify. Otherwise, the potential for a near monopoly on installation services and, therefore, higher than necessary installation costs, will present a real danger to the market.

The second approach requires non fixed devices to be capable of automatically adjusting the EIRP based upon detection of the presence and strength of RF transmissions from operating FSS earth stations is within the parameters of Tropos technology. To provide further protection to FSS earth stations from non-fixed unlicensed devices, a Dynamic Frequency Selection (DFS)-like, listen-before-talk mechanism can be integrated into the system. Additionally, Tropos fixed and non-fixed unlicensed devices are capable of transmitting an identification signal to facilitate determining the source of any interference. Overall, the capability enumerated by the Commission exists today at cost effective price points. Tropos embraces these protections and believes they will work effectively to protect current licensed users in the band.

Tropos has taken a consistent position that authorizing increased power levels for unlicensed wireless broadband will expand access and services to consumers, while protecting co and adjacent users. The Commission's proposal to allow fixed unlicensed devices to operate in the 3650 MHz band with a maximum EIRP of 25 Watts (14 dBw) is appropriate and should be extended to the other unlicensed bands. As to non fixed

devices, because of the limitations of battery power, the proposed limit of peak EIRP of 1 Watt for mobile devices is reasonable.

Summary

In its proposals addressing the 3650-3700 MHz band, the Commission recognizes the unique and innovative direction of wireless broadband technology. Tropos encourages the Commission to provide much broader opportunity to rollout broadband than historic concepts present. Expanding broadband initiatives to other spectrum bands, notably that of 700 MHz and the open spaces of TV broadcast spectrum, will make a tangible and meaningful difference in bringing competitive broadband access to all Americans.

Respectfully submitted,

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signed

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Certificate of Service

On July 28, 2004 a copy of the foregoing Comment of Tropos Networks was filed electronically with the Secretary of the Commission in Dockets ET No. 04-151, ET No. 02-380 and ET No. 98-237. Additionally, a copy of the Comment was provided via electronic mail to:

Mr. William Lane

Office of Strategic Planning and Policy Analysis

Federal Communications Commission

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signed

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